

SECTION IV—RIVERS AND FLOODS.

RIVERS AND FLOODS, JULY, 1916.

By ALFRED J. HENRY, Professor in Charge.

[Dated Weather Bureau, Washington, Sept. 2, 1916.]

FLOODS IN SOUTHERN RIVERS.

The passage of two tropical cyclones over the East Gulf and South Atlantic States separated by an interval of but a few days, both storms being attended by almost unprecedented precipitation, caused floods of great magnitude in the rivers of Alabama and the Carolinas and of lesser magnitude in the rivers of Georgia and eastern Tennessee. Many lives were lost and the destruction of property was greater than has been experienced in many years. By reason of the difficulty in securing and preparing the necessary meteorological and hydrological data for publication, a detailed account of this flood is deferred until the issue of the August, 1916, REVIEW.

FLOODS IN OTHER RIVERS.

A moderate flood occurred in the Red River of the North during the early part of the month, due to heavy rains over the watershed on June 26 and 27 and again on July 6 and 7. These rains were confined almost wholly to the watershed of the Red River of the North, and resulted in the rather unusual occurrence of a flood in summer. The damage to parks, roadways, etc., in the cities of Moorhead, Minn., and Fargo, S. Dak., did not exceed \$10,000, and this was mostly unpreventable.

Hydrographs for typical points on several principal rivers are shown on Chart 1. The stations selected for charting are Kekouk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

A METHOD OF FORECASTING THE MAXIMUM SUMMER LEVEL IN LAKE TAHOE FROM ONE TO FOUR MONTHS IN ADVANCE.

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[Weather Bureau, Reno, Nev., July 20, 1916.]

Lake Tahoe, a wonderful body of water of crystal-like clearness, about 21 miles long, 12 miles wide, and more than 500 feet deep, lies partly in Nevada and partly in California in the heart of the Sierras and has but one outlet—the Truckee River. Its waters, consisting chiefly of melted snow, pass through the United States Reclamation Service dam at Tahoe, Cal., and down the Truckee River to Pyramid Lake in northwestern Nevada. This lake is the chief source of water supply for irrigation, power, and municipal purposes in the Truckee Basin, which includes the large agricultural section in western Nevada known as the Truckee Meadows. Naturally a keen interest is taken in the behavior of Lake Tahoe by ranchers, power-plant managers, municipal officials, and many others, not only in the Truckee Valley but also in the Truckee-Carson irrigation project in Churchill County, Nev. Within the limits of the height of the gates at the Tahoe Dam the waters of this lake are under the control of the United States Reclamation Service, so

that in seasons of heavy run-off the level of the lake may be regulated with a view to storing as much water as possible for irrigating the Nevada farms, operating the power plants, etc., without permitting the water in the lake to rise to a point where it might damage property on the lake front. This control of the lake's level is as nearly perfect as the ingenuity and watchfulness of the reclamation officials can make it.

A study of the available snowfall and run-off data collected by the Weather Bureau in the Tahoe watershed for the years 1909–1915, begun in the spring and completed in the Fall of 1915, led us to believe that fairly accurate estimates of the probable maximum summer level in Lake Tahoe, and therefore its water supply, might be made several months in advance by a quantitative percentage-relationship method then devised and here briefly described.

The proposed method, which has been tested for two successive seasons with satisfactory results, requires only to know how many inches of snow (unmelted) have fallen monthly from December to April at each of the mountain-snowfall stations in the Truckee-Tahoe watershed. (See Table 1.)

Precipitation data for the months of November, May, June, and July are not necessary, but should exceptionally heavy rains occur in the watershed after May 1—a very remote possibility—the estimated levels would have to be raised accordingly. This correction would be a simple matter. As a rule the precipitation that occurs after May 1 is not at all likely to alter the estimates made earlier in the season.

The average fall of snow for the entire watershed for any month, computed to the nearest whole inch, is obtained by dividing the sum of the several monthly amounts reported, by the number of stations reporting. No attempt at weighting the individual monthly or seasonal falls has been made, for the reason that the number of points (9) at which regular observations are made is so small relatively to the watershed's area (519 square miles) as to make that proceeding unnecessary; also for the further reason that good results have been obtained without such weighting.

To illustrate: The average snowfall for the entire watershed for the month of December, 1915, given as 38 inches in one of the subjoined tables was obtained as shown in Table 1.

TABLE 1.—Snowfall for the entire watershed of Lake Tahoe, December, 1915.

Stations.	Altitude (M. S. L.).	Total snow- fall, De- cember, 1915 (un- melted).
	<i>Feet.</i>	<i>Inches.</i>
West side of lake:		
Hobart Mills, Cal.....	5,900	32
Truckee, Cal.....	5,819	25
Tahoe, Cal.....	6,225	42
McKinney, Cal.....	6,225	43
Fallen Leaf, Cal.....	6,400	39
Tallac, Cal.....	6,225	33
East side of lake:		
Marlette Lake, Nev.....	7,900	68
Glenbrook, Nev.....	6,225	28
Bijou, Cal.....	6,225	29
Sum.....		339
Average for basin (339÷9).....		38